

Specification Amendments

At page 3, lines 4-6, rewrite the paragraph as follows:

This application is a continuation-in-part of U.S. Patent Application Serial No. 10/140,915, filed May 7, 2002, now U.S. Patent No. 6,811,145, which is incorporated by reference in its entirety.

At page 3, lines 3-4, rewrite the paragraph as follows:

Figure 5 is cross-sectional view of a rail and upright member of the panel framework of Figure 4 taken along line 5-5, shown prior to welding.

At page 13, line 14 - Page 14, line 3, rewrite the paragraph as follows:

Additional rails 10 and upright members 12 comprising the panel framework 14 may be welded together by repeating the steps described above, until a integral panel has been formed. In each such instance, an upright member 12 will be transversely positioned within the rail channel 26 of the rail 10 to which it is to be secured, so that it contacts at least one, and preferably both, of the weld-forming regions 28. The upright member 12 is contacted with an electrode having a first polarity, and the rail 10 is contacted with an electrode having a second polarity opposed to the first polarity. While the rail 10 is undergoing compression as described above, a welding current is transmitted between the two electrodes to cause the weld-forming region to form a weld 36

within the rail channel 26 which joins the upright member 12 to the rail 10. After each panel 16 is assembled as described, it is preferably provided with a polyester powder coating in order to enhance its resistance to corrosion.

At page 14, lines 4-10, rewrite the paragraph as follows:

The welding steps required to assembled a panel from rails 10 and upright members 12 may be performed in succession, or some or all of these steps may be performed simultaneously, preferably using a separate pair of electrodes to form each weld. For example, with the panel 16 shown in Figure 1, seven adjacent upright members 12 may be welded simultaneously to both the upper and lower rails 10.

At page 14, line 21 - page 15, line 3, rewrite the paragraph as follows:

The welding steps required to form a panel 16 may advantageously be performed with automated equipment, such as a press-type welding machine. Such a welding machine may comprise one or more welding heads, each of which contains first and second electrodes which can respectively contact an upright member 12 and an associated rail 10. While current flows between the first and second electrodes, the welding machine simultaneously pressurizes the joint between the upright member 12 and rail 10. When the head is retracted, the partially assembled panel may be repositioned, so that another weld or group of welds may be formed.

At page 18, line 16 - page 19, line 6, rewrite the paragraph as follows:

With reference to Figure 9, the welding area 78 of the apparatus 50 comprises an area in which the panel framework 14 may be horizontally positioned in a first welding position. Situated within the welding area 78 is at least one, and preferably a plurality of welding stations 82. The plural welding stations 82 are preferably of identical construction, and are arrayed in a series of parallel rows. More preferably, the welding stations 82 are arrayed in an even number of parallel rows. In the embodiment shown in Figure 9, the apparatus 50 features welding stations 82 arrayed a total of eight rows: a first row 84, second row 86, third row 88, fourth row 90, fifth row 92, sixth row ~~92~~ 94, seventh row 96 and eighth row 98. Preferably the first and second rows ~~82~~ 84 and ~~82~~ 86 are separated by a distance equalling the spacing of adjacent upright members 12 in the panel framework 14. The third and fourth rows 82 and 90, and each successive pair of odd- and even-numbered adjacent rows, are preferably characterized by the same separation distance as the first and second rows 82 and 84.

At page 19, line 18 - page 20, line 2, rewrite the paragraph as follows:

The separation distance between the second and third rows 86 and 88 may, but need not, equal the separation distance between each successive pair of even- and odd-numbered adjacent rows.

Thus, in the embodiment shown in Figure 9, the distance between the second and third rows 86 and 88 is three times the separation distance between adjacent upright members 12, while the fourth and fifth rows 90 and 92 are separated by four times the separation distance between adjacent upright members 12. The sixth and seventh rows 94 and 96 are separated by five times the separation distance between adjacent upright members 12.

At page 22, lines 21-26, rewrite the paragraph as follows:

The first welding station 100 further comprises an anvil assembly 116, positioned in opposition to the electrode assembly ~~101-103~~, which functions to bracingly engage the second side 18 of the panel framework 14. Such bracing engagement assists in maintaining the position of the panel framework 14 as the electrode assembly 103 engages the first side 16 of the panel framework.

At page 27, lines 4-14, rewrite the paragraph as follows:

In the next stage of the welding process, shown in Figures 15 and 16, the second electrode 108 and the first electrode 104 are moved into contact with the first side 16 of the panel framework 14. Preferably, the second electrode 108 is first brought into contact within the first side 16, followed by the first electrode 104. Once both electrodes 104 and 108 are in contact with the first side 16, a welding current is transmitted between the first and second electrodes 104 and ~~106~~ 108 to cause the weld-forming region 28 in the first rail 40 to form a weld

within the rail channel 26. This weld joins the first upright member 46 to the first rail 40.

At page 28, lines 10-21, rewrite the paragraph as follows:

The surface 146 of the second electrode ~~106~~ 108 which contacts the first upright member 46 is preferably flat and rectangular. The width of surface 146 is preferably at least about 75%, and more preferably at least 100%, of the width of first upright member 46. The length of surface 146 is preferably between about 2.5 and about 5 times its width. In one preferred embodiment of the panel framework using upright members having a square cross-section with a side of 0.60 inches, the second electrode 108 is characterized by a width of 0.75 inches, and a length of 2.75 inches. Such sizing of the second electrode 108 assures that welding current density will not be not so great as to cause external melting of the first upright member 46.

At page 28, line 22 - page 29, line 8, rewrite the paragraph as follows:

The side-by-side placement of the first and second electrodes 104 and 108 enables a step welding process to occur at the weld-forming region 28. In this regard, the lateral spacing of the first electrode 104 and the second electrode 108 is preferably no greater than required to permit transmission of a weldingly effective current through the weld-forming region 28, without excessive current shunting. In a preferred embodiment using a

first electrode ~~10~~ 104 having surface 144 a diameter of 1.25 inches, and a second electrode having a rectangular surface length of 2.75 inches, the lateral spacing between the first and second electrodes 104 and 108, measured between their respective centers, is preferably between about 2 and about 3 inches, and more preferably about 2.5 inches.

At page 29, lines 9-25, rewrite the paragraph as follows:

The next stage of the welding process relates only to welding stations, like the first welding station 100, which have more than two electrodes. In this stage, shown in Figure 17, the second electrode 108 maintains contact with the first side 16 of the panel framework 14. The first electrode 104 is withdrawn, and the third electrode 112 is moved into contact with the first side 16. Once both electrodes 108 and 112 are in contact with the first side 16, a welding current is transmitted between the third and second electrodes 112 and ~~106~~ 108, causing the weld-forming region 28 in the second rail 42 to form a weld within the rail channel 26. This weld joins the first upright member 46 to the second rail 42. The sizing and positioning of the third electrode 112 in relation to the second rail 42 is preferably identical to that described with reference to the first electrode 104 and the first rail 40. Similarly, the lateral spacing between the third electrode 112 and second electrode 108 is preferably identical to that described with reference to the first electrode 104 and second electrode 108.

At page 31, lines 1-7, rewrite the paragraph as follows:

As Figure 9 illustrates, other upright members 12 of the panel framework 14 are aligned with other rows of welding stations 82 while the panel framework 14 is in its first welding position. Thus, the second upright member 48, which is disposed immediately adjacent first upright member 46 is aligned with first and second welding stations 132 and ~~143~~ 134 of the second row 86. Other upright members 12 are aligned with the welding stations of rows 88-98.

At page 33, lines 15-22, rewrite the paragraph as follows:

Once the pallet 72 has been moved through a sufficient number of welding positions to complete the welding steps described above, the gripper 80 moves the pallet 72, now bearing an integral welded panel ~~82~~ 148, in downstream direction 60 out of the welding area 78, as shown in Figure 7B. As this occurs, the other gripper 80, positioned adjacent the upstream end of gantry 76, moves the adjacent upstream pallet 72, bearing another panel framework 14, into the welding area 78. After the next adjacent upstream pallet 72 arrives in the welding area 78, the above-described welding steps are repeated.

At page 33, line 25 - page 34, line 9, rewrite the paragraph as follows:

Supported by the carriage 162 are a plurality of grippers 164, preferably four in number, which are disposed in spaced

relationship about the base of the carriage 162. The grippers 164 are preferably movable, such as by rotation, between a retracted mode and an extended mode. While the downstream lift 150 is in its upper position, shown in Figure 18, the carriage ~~72~~ 162 may be moved to its loading position, which immediately overlays the pallet 72. In this configuration of the apparatus 50, the grippers 164, while retracted, closely clear pallet 72. In their extended mode, however, the grippers 164 may releasably grasp and suspend a panel 148 carried by pallet 72.

At page 36, lines 3-9, rewrite the paragraph as follows:

Figure 18 shows the first stage of the operation of the output conveyor system 156 and the downstream lift system 150. A pallet 72, carrying a panel 148, is discharged from welding area 78 and is received on the lift platform 152, which is in its upper position. The carriage 162 is moved longitudinally on the output gantry 160 to its loading position, and the grippers ~~96~~ 164 are extended so as to releasably grasp and suspend the panel 148.

At page 36, lines 10-17, rewrite the paragraph as follows:

Figure 20 shows the next stage of operation of the output conveyor system 156 and downstream lift system 150. As the downstream lift 150 descends to its lower position, the pallet 72 separates from the panel 148, which remains overhead, held in place by the grippers ~~96~~ 164. Once the downstream lift 150 reaches its lower position, the conveyor system 154 is actuated, causing the

pallet 72 to move in the upstream direction 70. The pallet 72 discharges onto the upstream conveyor system 68.

At page 36, lines 18-25, rewrite the paragraph as follows:

As the downstream lift system 150 begins to descend, the carriage 162 moves from its loading position to the unloading position shown in Figure 20. At approximately the same time, the cylinder 174 is actuated so as to raise the upper ramp 168 to its horizontal raised position underneath the unloading position. The grippers 164 then release the panel 148 from carriage 162, and the panel 148 thereupon drops a short distance onto the horizontal upper ramp ~~164~~ 168.

At page 37, lines 10-17, rewrite the paragraph as follows:

After the panel 148 has been released from the carriage ~~172~~ 162 at the unloading position, the carriage ~~172~~ 162 returns to the loading position, as shown in Figure 22. Similarly, once the pallet 72 has been discharged from the downstream lift 150 while in its lower position, the downstream lift 150 returns to its upper position. In this configuration, the output conveyor system 156 and downstream lift system 150 are ready to process the next pallet 72 and panel 148 which discharge from the welding area 78..